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HSV-1-based vectors for gene therapy of neurological diseases and brain tumors: part II. Vector systems and applications.

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Many properties of HSV-1 are especially suitable for using this virus as a vector to treat diseases affecting the central nervous system (CNS), such as Parkinson's disease or malignant gliomas. These advantageous properties include natural neurotropism, high transduction efficiency, large transgene capacity, and the ability of entering a latent state in neurons. Selective oncolysis in combination with modulation of the immune response mediated by replication-conditional HSV-1 vectors appears to be a highly promising approach in the battle against malignant glioma. Helper virus-free HSV/AAV hybrid amplicon vectors have great promise in mediating long-term gene expression in the PNS and CNS for the treatment of various neurodegenerative disorders or chronic pain. Current research focuses on the design of HSV-1-derived vectors which are targeted to certain cell types and support transcriptionally regulatable transgene expression. Here, we review the recent developments on HSV-1-based vector systems and their applications in experimental and clinical gene therapy protocols.

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